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JACOBS ENGINEERING GROUP INC.

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TELEPHONE (508) 564-5746 • FAX (508) 564-6425

April 16, 1998

Mr. Jim F. Snyder
Remediation Program Manager
HQ AFCEE/MMR
322 East Inner Road, Box 41
Otis ANG Base, MA 02542-5028

RE: Letter Report, Surface Water Sample Results for EDB, Fuel Spill Site No. 1 (FS-1) Quashnet River/Cranberry Bog Area

Dear Mr. Snyder:

As directed by the Air Force Center for Environmental Excellence, Jacobs Engineering Group Inc. is hereby providing twenty-two bound copies, one unbound copy, and 1 electronic copy of the *Letter Report, Surface Water Sample Results for EDB, Fuel Spill Site No. 1 (FS-1) Quashnet River/Cranberry Bog Area,* dated April 16, 1998. Per direction of Mr. Bud Hoda, we have not distributed copies to the regulatory agencies or other external reviewers.

The scope-of-work for this sampling and reporting effort states that this document would be the only deliverable.

Please feel free to contact me or Larry Pannell at (508) 564-5746 extension 275, if you have any questions or comments.

Sincerely,

Eric W. Banks, P. E.
Program Manager

Enclosures: Document (23 & 1 EDD)

cc:

JACOBS ENGINEERING GROUP INC.:
Project Manager (1)
Technical Lead (1)
Karen Wilson (w/o attachment)
File - Document Control (2)

LETTER REPORT

SURFACE WATER SAMPLE RESULTS FOR EDB FUEL SPILL SITE No.1 (FS-1) QUASHNET RIVER/CRANBERRY BOG AREA

April 16, 1998

1.0 INTRODUCTION

This letter report provides the results of surface water sampling for 1,2-dibromoethane (also known as ethylene dibromide or EDB) which was completed at ten locations within the upper Quashnet River/cranberry bog area located in Mashpee, Massachusetts. The source of the EDB is believed to be the Fuel Spill No. 1 (FS-1) site which is located approximately 8000 feet north of the cranberry bog on the eastern side of the airfield at the Massachusetts Military Reservation (Figure 1).

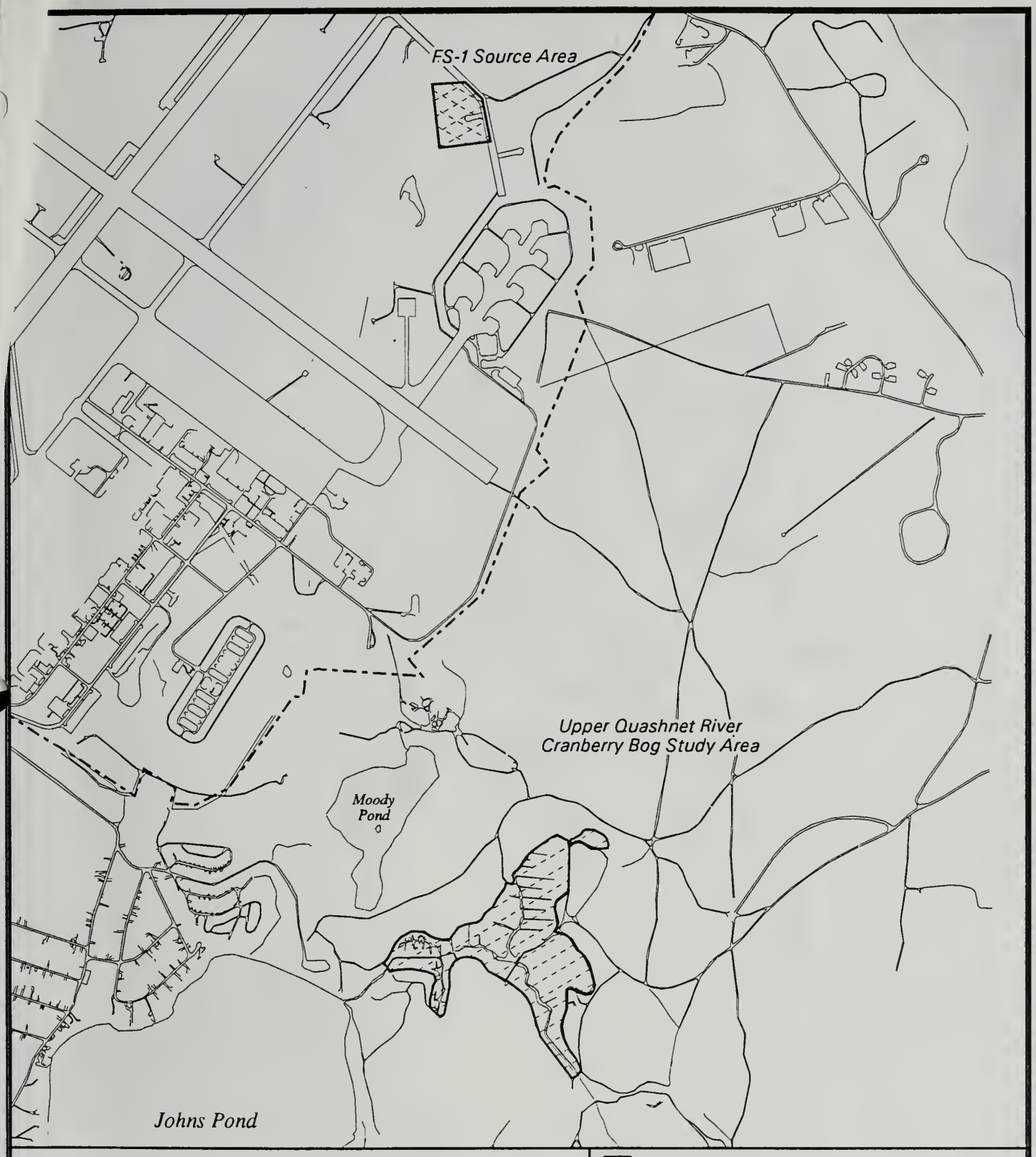
This work was performed for the Air Force Center for Environmental Excellence (AFCEE) by Jacobs Engineering Group Inc. under Contract No. F41624-94-D-8046, Delivery Order 31. The investigation was undertaken as a follow-up to the surface water sampling effort documented in the draft Letter Report, Surface Water Risk Evaluation at Fuel Spill Site No. 1 (FS-1), Quashnet River/Cranberry Bog Area, September 25, 1997 (AFCEE 1997).

The objective of the field investigation was to determine the concentration of EDB in surface water at a time when the bogs are flooded. Sampling occurred at stations in the northern portion of the bog where the highest concentrations of EDB had previously been reported, and at new and pre-existing sample stations in the southern portion of the bog. The samples were collected on February 11, 1998 using procedures described in the MMR Quality Program Plan (AFCEE 1998). Ten field samples and one field duplicate (total of eleven samples) were collected at the locations indicated on Figure 2. The samples were submitted to Quanterra Environmental Services (QESF) in Tampa, Florida for analysis of 1,2-dibromoethane using EPA Method 504.

Stream flow measurements at four stations within the bog were planned to coincide with the surface water sampling effort. Due to the high surface water levels within the bog system, it was not possible to collect these data.

2.0 RESULTS

The sample results are tabulated in Table 1 and are posted on Figure 2. EDB was detected in four of the eleven samples at concentrations ranging from 0.025 to 0.20 µg/L. As shown in Table 1, the detection limit for these analyses was 0.0035 µg/L



Legend

MMR Boundary

FS-1 Source Area

Upper Quashnet River
Cranberry Bog Study Area

N

0 1400'

Scale 1:16800

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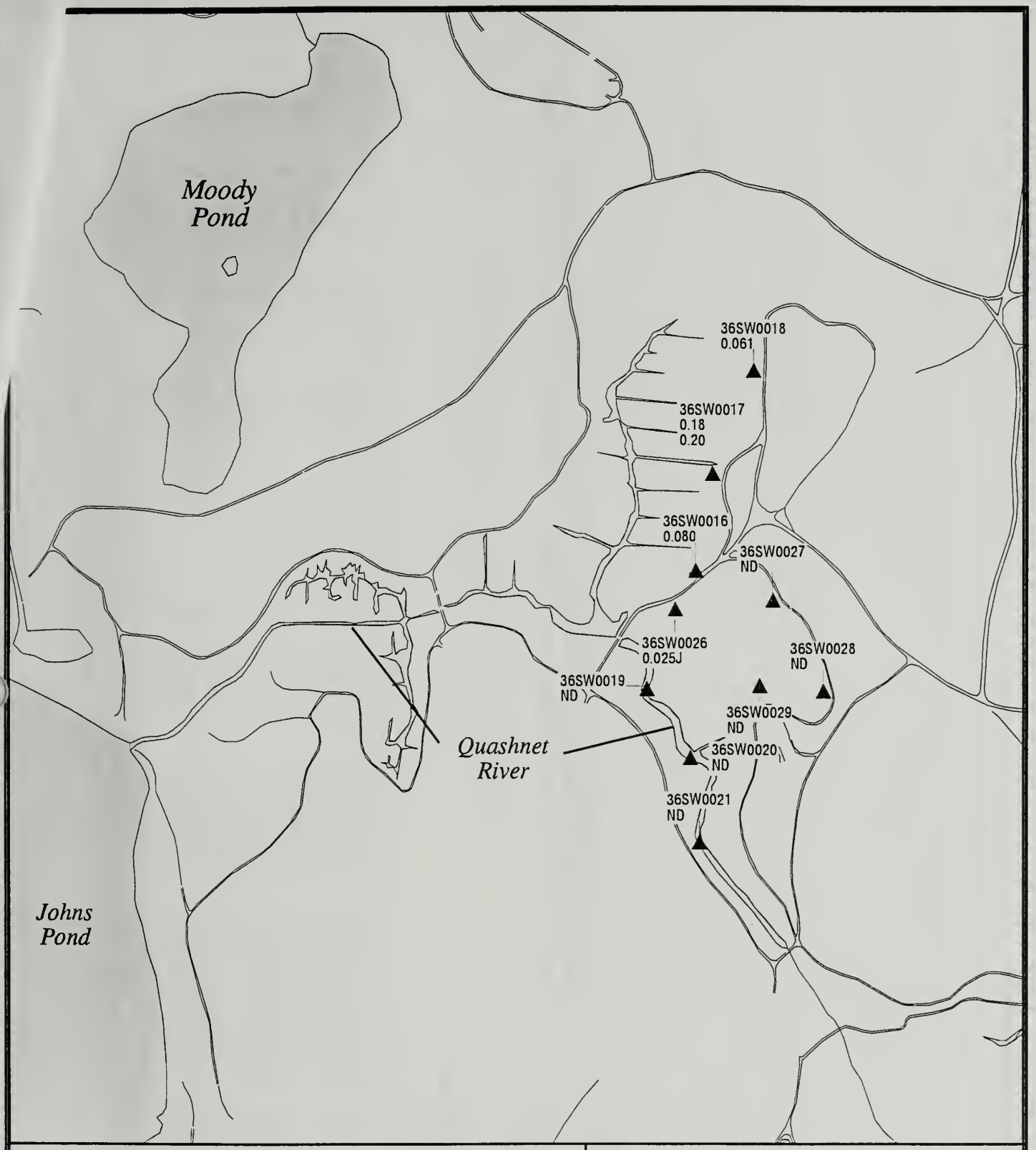
Fuel Spill 1 (FS-1) Source Area
Upper Quashnet River
Cranberry Bog Study Area

Massachusetts Military Reservation
Cape Cod, Massachusetts

02/25/98 d:/gis/projects/35g484/01/fs1_8bp.aml

Figure: 1

Drawn by DM



Legend

▲ Surface Water Sampling Point

Notes:

1. *Samples collected on 2/11/98*
2. *Bog flooded at time of sampling*
3. *J - estimated concentration*

N

0 500'

Scale 1:6000

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Fuel Spill (FS-1) Surface Water Sampling Locations and EDB Results (2/11/98)

Massachusetts Military Reservation
Cape Cod, Massachusetts

04/10/98 d:/gis/projects/35g484/01/fs1_8fp.aml

Figure: 2

Drawn by: DMiller

TABLE 1
FS-1 February Sampling Event
EDB Results

Location	Test	Analyte	Sample ID	Date	Type	Result	MDL	RL	Units	Qualifier
36SW0016	E504	1,2-DIBROMOETHANE (EDB)	36SW0016-02	02/11/98	N1	0.080	0.0035	0.01	µg/L	
36SW0017	E504	1,2-DIBROMOETHANE (EDB)	36SW0017-02FD	02/11/98	FD1	0.20	0.0035	0.01	µg/L	
36SW0017	E504	1,2-DIBROMOETHANE (EDB)	36SW0017-02	02/11/98	N1	0.18	0.0035	0.01	µg/L	
36SW0018	E504	1,2-DIBROMOETHANE (EDB)	36SW0018-02	02/11/98	N1	0.061	0.0035	0.01	µg/L	
36SW0019	E504	1,2-DIBROMOETHANE (EDB)	36SW0019-02	02/11/98	N1	ND	0.0035	0.01	µg/L	U
36SW0020	E504	1,2-DIBROMOETHANE (EDB)	36SW0020-02	02/11/98	N1	ND	0.0035	0.01	µg/L	U
36SW0021	E504	1,2-DIBROMOETHANE (EDB)	36SW0021-02	02/11/98	N1	ND	0.0035	0.01	µg/L	U
36SW0026	E504	1,2-DIBROMOETHANE (EDB)	36SW0026-01	02/11/98	N1	0.025	0.0035	0.01	µg/L	J
36SW0027	E504	1,2-DIBROMOETHANE (EDB)	36SW0027-01	02/11/98	N1	ND	0.0035	0.01	µg/L	U
36SW0028	E504	1,2-DIBROMOETHANE (EDB)	36SW0028-01	02/11/98	N1	ND	0.0035	0.01	µg/L	U
36SW0029	E504	1,2-DIBROMOETHANE (EDB)	36SW0029-01	02/11/98	N1	ND	0.0035	0.01	µg/L	U

MDL = Method Detection Limit
RL = Reporting Limit
µg/L = micrograms per liter
ND = Not detected

Data Qualifiers:
U = Not detected
J = Estimated result. The percent difference (%D) between the primary and confirmation column results for the sample was outside the acceptance criteria of 25 percent. Based on data review guidelines, when the %D exceeds the acceptance criterion, the most conservative result from either the primary or confirmation column should be reported qualified as an estimated value. Data quality is not adversely affected and the results may be used.

The highest concentrations of EDB occurred at locations 36SW0016 through 36SW0018. These are the same locations where the highest EDB concentrations were recorded during previous sampling conducted in August 1997 and is believed to represent the area where the majority of the groundwater contaminated with EDB is upwelling into the bog (AFCEE 1997).

3.0 DISCUSSION

Table 2 (below) summarizes the results for stations which were sampled in both August 1997 and in February 1998. As indicated in the table, the concentration of EDB in surface water samples at stations 36SW0016 through 36SW0018 decreased by approximately an order of magnitude. This decrease is probably due to the fact that the bog was in a flooded condition in February 1998 and was not flooded in August 1997. The river water used for flooding has historically been free of EDB and would be expected to significantly dilute the EDB-contaminated groundwater seeping into the bog. The flooded bog also creates a hydraulic head which may slightly reduce the upwelling of EDB-contaminated groundwater.

EDB was not detected in the samples collected on February 11, 1998 from Stations 36SW0019 through 36SW0021, although low concentrations were detected at these locations in August 1997.

TABLE 2
COMPARISON OF EDB CONCENTRATIONS AT
STATIONS SAMPLED IN BOTH AUGUST 1997 AND FEBRUARY 1998

Location	EDB Concentration (µg/L) 8/27/97	EDB Concentration (µg/L) (2/11/98)
36SW0016	0.937	0.080
36SW0017	1.43	0.18/0.20
36SW0018	0.668	0.061
36SW0019	0.039/0.043	ND
36SW0020	0.045	ND
36SW0021	0.049	ND

The February 1998 sampling event is the first time that samples were collected at stations 36SW0026 through 36SW0029 (Table 1). These stations were chosen to provide coverage in the southern portion of the bog where sampling had not been conducted previously. The results were non-detect (ND) except at station 36SW0026 where EDB was detected at an estimated concentration of 0.025 µg/L [this result was estimated because the percent difference (%D) between the primary and confirmation column results were outside the acceptance criteria of 25 percent. Based on data review guidelines, when the %D exceeds the acceptance criterion, the

lowest value from either the primary or confirmation column is reported qualified as an estimated value. Data quality is not adversely affected and the results may be used]. EDB was not detected at sampling stations south or east of this location.

4.0 CONCLUSIONS

The following conclusions were reached based on the results of the February 1998 surface water sampling event:

- The concentrations of EDB in surface water decreased by approximately one order of magnitude from the August 1997 sampling event to the February 1998 sampling event.

- This decrease is attributed to dilution resulting from flooding of the bogs with water from the upper Quashnet River.

- Assuming that similarly reduced EDB concentrations would occur during the fall harvest when the bogs are also flooded, the results from the February 1998 sampling could be used to revise the estimated risk of exposure to EDB by a cranberry worker during harvest time. If such a risk evaluation was performed, it would result in a lower estimate of risk than was calculated previously.

5.0 REFERENCES

AFCEE (U.S Air Force Center for Environmental Excellence). 1997 (September 25), *Draft Surface Water Risk Evaluation at Fuel Spill Site No. 1 (FS-1) Quashnet River/Cranberry Bog Area.* Prepared by Jacobs Engineering Inc. for AFCEE/MMR Installation Restoration Program, Otis Air National Guard Base, MA.

AFCEE. 1998 (January). *Quality Program Plan.* Prepared by Jacobs Engineering Inc. for AFCEE/MMR Installation Restoration Program, Otis Air National Guard Base, MA.

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Not to be taken from this room

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Bourne, MA 02532

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE
INSTALLATION RESTORATION PROGRAM
OTIS AIR NATIONAL GUARD BASE, MA 02542-5028

April 30, 1998

Mr. Richard Fitzgerald, Director
Jonathan Bourne Public Library
19 Sandwich Road
Bourne MA 02532

Dear Mr. Fitzgerald:

Enclosed please find a copy of the following publications:

1. "Massachusetts Military Reservation Plume Response Program Final Work Plan for the Ecological Assessment Associated with Groundwater Plumes and Remedial Activities April 1998"

2. "Massachusetts Military Reservation Plume Response Program Summary of the Summer 1997 Ecological Field Event for the Ashumet Valley and LF-1 Groundwater Plumes April 1998"

3 "Letter Report, Surface Water Sample Results for EDB, Fuel Spill Site No. 1 (FS-1) Quashet River/Cranberry Bog Area."

It is requested these publications be made available to the public in your library in order to increase awareness about the ongoing activities at the base.

Kindly sign below to acknowledge receipt of these publications. As always, your assistance is greatly appreciated. Should you have any questions, please feel free to contact me.

Sincerely,

DOUGLAS C. KARSON
Public Affairs Specialist
(508) 968-4678

Received by _____ Date 5/5/98

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